

## IN THE SPECIFICATION

(Note: in the amendments to the specification set forth below, the page and line numbers refer to the Substitute Specification (clean version), filed on March 22, 2004.)

Please amend the paragraph beginning at page 9, line 13 and ending at page 10, line 10, as follows.

--Another object of the present invention is to provide a ferroelectric thin film element having a substrate and an epitaxial ferroelectric thin film provided on the substrate, in which the epitaxial ferroelectric thin film (1) satisfies a relation  $z/z_0 > 1.003$ , wherein a crystal face parallel to a crystal face of a surface of the substrate, among crystal faces of the epitaxial ferroelectric thin film, is taken as a Z crystal face, a face spacing of the Z crystal face is taken as  $z$  and a face spacing of the Z crystal face of a material constituting the epitaxial ferroelectric thin film in a bulk state is taken as  $z_0$ , and (2) also satisfies a relation  $0.997 \leq x/x_0 \leq 1.003$ , wherein one of the crystal faces of the epitaxial ferroelectric thin film perpendicular to the Z crystal face is taken as an X crystal face, a face spacing of the X crystal face is taken as  $x$  and a face spacing of the X crystal face of the material constituting the epitaxial ferroelectric thin film in a bulk state is taken as  $x_0$ . (It is understood that the term "crystal face" used herein is interchangeable with the term "crystal plane.") According to the present invention, there can be obtained a ferroelectric thin film element free from deterioration of its

characteristics, showing a high spontaneous polarization and suitable for thin film formation.--

Please amend the paragraph beginning at page 32, line 3 and ending at line 16, as follows.

--The Referring to Fig. 5, the liquid discharge head of the present invention is provided with a liquid discharge port 14, a pressure chamber 15 communicating with the liquid discharge port 14, a vibrating plate 10 constituting a part of the pressure chamber 15, and a piezoelectric actuator unit 9 provided outside the pressure chamber 15 for providing the vibrating plate 10 with vibration. The liquid discharge port 14 generally has the shape of a nozzle. As mentioned, a part of the pressure chamber 15 is constituted by the vibrating plate 10, and in an external part thereof at least the aforementioned piezoelectric actuator is provided to constitute the ferroelectric actuator unit of the liquid discharge head.--

Please amend the paragraph beginning at page 55, line 14 and ending at page 56, line 1, as follows.

--Fig. 5 shows a schematic cross-sectional view of an ink jet head of the present example. A substrate having a configuration of boron (B)-doped monocrystalline Si(100)/SiO<sub>2</sub>/Si (layer thicknesses of 2.5  $\mu\text{m}$ /1  $\mu\text{m}$ /250  $\mu\text{m}$ ) was employed,~~and an~~ In the

figure, the Si layer is labeled 1, the SiO<sub>2</sub> layer is labeled 2, and the Si(100) layer is labeled  
3. An MgO (100) film 4 was formed with a thickness of 0.3  $\mu\text{m}$  on the Si (100) layer3.  
Then a Pt (001) film 5 of 0.2  $\mu\text{m}$  serving as an electrode, a PT (001) film 6 of 0.1  $\mu\text{m}$   
thereon, and a PZT film 7 of a thickness of 2  $\mu\text{m}$  prepared under the same conditions as in  
example 4 as an epitaxial ferroelectric film having a piezoelectric property were prepared  
in succession by epitaxial growing. The PZT film had a composition of  $\text{Pb}(\text{Zr}_{0.52},$   
 $\text{Ti}_{0.48})\text{O}_3$ . Then an Au paste 8 was coated as an upper electrode, whereby a piezoelectric  
actuator unit was prepared.--